REMARKS

The Office Action mailed December 18, 2002, has been received and reviewed. Claims 1 through 65 are currently pending in the application, of which claims 1 through 6, 8, 10 through 19, 22, 24 through 26, and 44 through 55 are currently under examination. Claims 7, 9, 20, 21, 23, 27 through 43, and 56 through 65 are withdrawn from consideration as being drawn to a non-elected invention. Claims 1 through 6, 8, 10 through 13, 15 through 19, 22, 25, 26, and 44 through 55 stand rejected. Claim 12 is indicated to be a **product-by-process** claim. Claims 14 and 25 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation. Applicant has amended claims 1, 3, 5, 7, 12, 13, 15, 20, 26, 46, 47, 49, 52 and 55, and cancelled claims 2, 4, 6, 19, 27 through 43, and 56 through 65 without prejudice or disclaimer. New claims 66 and 67 have been added. Applicant respectfully requests reconsideration of the application as amended herein.

35 U.S.C. § 112 Claim Rejections

Claims 13 and 26 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

With respect to claim 13, Applicant has amended the claim as suggested by the Examiner to particularly point out and distinctly claim the invention in accordance with 35 U.S.C. § 112, second paragraph. The amendment to claim 13 is not made for the purpose of narrowing the scope of the claim, but to more clearly recite the limitations contained therein. As such, Applicant asserts that no surrender or disclaimer of claim scope, and more specifically, of the broadest possible range of equivalents to which Applicant may be entitled has been effectuated.

Claim 26 stands rejected for reciting "a second layer of resilient conductive material," which the Office Action indicates is not shown in the drawings. Applicant respectfully submits that this feature is, in fact, shown in the drawings and is further supported by the as-filed specification. At page 20, paragraph [0062] the specification discloses an MCM (multi-chip module) 500 having BGA packages 10a and 10b mounted to upper and lower surfaces 522 and

524. At page 20, paragraph [0063], the specification discloses first and second layers of resilient conductive material 530a and 530b, the second layer of conductive material 530b being disposed on lower surface 524. All of these features, including the second layer of conductive material 530b, are clearly illustrated in FIG. 16 of the original drawings and the subsequently filed formal drawings.

Based on the foregoing, Applicant respectfully requests that the rejections of claims 13 and 26 under 35 U.S.C. § 112, second paragraph, be withdrawn.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 5,173,055 to Grabbe

Claims 1 through 6, 8, 10 through 11, 13, and 44 through 52 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Grabbe (U.S. Patent No. 5,173,055). Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Grabbe discloses an area array connector for electrically connecting two electronic devices. The connector comprises a number of contact elements 10 formed from a sheet of material 12 (Fig. 1). Each contact element 10 includes a pair of upwardly biased contact fingers 18 extending from one side and a pair of legs 22 extending from an opposite side (col. 2, lines 3-8). In one disclosed embodiment, a film of insulating material 26 is adhered to the surface of contact elements 10 to form a contact laminate 32 (Fig. 3). Contact laminate 32 is secured to a circuit board 40 by soldering legs 22 of contact elements 10 to contact pads 47 of plated vias 46 in circuit board 40 (col. 2, lines 49-56). Grabbe discloses that the connector functions by electrically engaging contact fingers 18 of contact elements 10 with contact pads 53 on a second circuit board 48 (Fig. 9).

Independent claims 1 and 3, as amended herein, recite the limitations of a layer or sheet of resilient conductive material "defining a plurality of electrically isolated conductive traces and a plurality of electrically isolated spring-biased electrical contacts," with "each electrically isolated spring-biased electrical contact extending from one of said plurality of electrically isolated conductive traces." Claims 1 and 3 further recite the limitation of plurality of vias, wherein each via comprises "a recess into which one of said plurality of electrically isolated spring-biased electrical contacts may be deflected."

Similarly, amended independent claim 5 recites the limitations of a layer of resilient conductive material having "at least one spring-biased electrical contact formed in said layer" and "at least one conductive trace formed in said layer" with "said at least one conductive trace terminating at said at least one spring-biased electrical contact." Claim 5 also recites the limitation of at least one via "aligned with said at least one spring-biased electrical contact such that said at least one spring-biased electrical contact may be deflected into said at least one via."

Applicant respectfully submits that Grabbe fails to describe, expressly or inherently, any of the above-described limitations of claims 1, 3 and 5. First, Grabbe does not disclose any conductive traces that are formed from the same layer or sheet of conductive material as spring-biased electrical contacts. Instead, Grabbe discloses an array of discrete contact elements 10 that are soldered directly to contact pads 47 of plated vias 46 (Fig. 8). Grabbe also fails to disclose vias comprising recesses into which the spring-biased electrical contacts may be deflected. The illustrations and disclosure of Grabbe show that contact fingers 18 cannot be deflected into plated vias 46, as they are too large (Figs. 6, 8 and 9). Plated vias 46 are described by Grabbe as soldering locations for contact elements 10 and are not contemplated as providing a deflection space for contact fingers 18 (col. 2, lines 49-52).

In view of the foregoing, Applicant respectfully submits that independent claims 1, 3 and 5 are allowable over Grabbe under the provisions of 35 U.S.C. § 102(b). Claims 8, 10, 11, 13, and 44 through 52, which depend from and incorporate all of the limitations of claims 1, 3 and 5, are allowable for the same reason.

Further, claim 13 recites the additional limitation of "at least one contact element disposed on said surface of said at least one spring-biased electrical contact and configured to

remove or puncture through a layer of contaminants formed on an exterior surface of a lead element." Claims 45, 48 and 51 recite the limitation of a dielectric layer over the resilient conductive material "of sufficient thickness to encompass at least a portion of each lead element of an integrated circuit device." Claims 46, 49 and 52 have been amended to more clearly recite that the apertures in the dielectric layer "are of a frustoconical configuration *decreasing in size towards said layer [or sheet] of resilient conductive material*." (Emphasis added.) Grabbe also fails to describe these limitations, and claims 13, 45, 46, 48, 49, 51 and 52 are allowable for that reason, as well.

The rejections of claims 2, 4 and 6 are moot, as these claims have been cancelled without prejudice or disclaimer.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,173,055 to Grabbe in view of U.S. Patent No. 5,829,988 to McMillan et al.

Claims 15 through 19, 22, 24, 26, and 53 through 55 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Grabbe (U.S. Patent No. 5,173,055) in view of McMillan et al. (U.S. Patent No. 5,829,988). Applicant respectfully traverses this rejection, as hereinafter set forth.

> M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:
>
> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 15 through 19, 22, 24, 26, and 53 through 55 are improper because the cited references fail to establish a *prima facie* case of obviousness.

McMillan et al. is directed to a socket assembly for an integrated circuit chip carrier package, and is combined with Grabbe to provide the teachings of an integrated circuit device 14 disposed on a first surface of a substrate and a clamping device 16. (*See* McMillan et al. at Figures 2 and 3A.) Applicant respectfully submits that neither of the cited references, alone or as combined, teach nor suggest all the limitations of claims 15 through 18, 22, 24, 26, and 53 through 55.

Independent claim 15, as amended herein, recites the limitations of a layer of resilient conductive material having "a plurality of spring-biased electrical contacts formed in said layer" and "a plurality of conductive traces formed in said layer of resilient conductive material, at least a portion of said plurality of conductive traces each terminating at one spring-biased electrical contact." Claim 15 also recites the limitations of a plurality of vias, wherein each via is "positioned at a location underlying one spring-biased electrical contact of said plurality of spring-biased electrical contacts" and "at least one integrated circuit device electrically contacting one spring-biased electrical contact of said plurality of spring-biased electrical contacts and downwardly deflecting said one spring-biased electrical contact into one via of said plurality of vias."

For the same reasons as described above, Applicant respectfully submits that Grabbe fails to describe, expressly or inherently, any of the above-described limitations of claims 1, 3 and 5. Specifically, Grabbe does not disclose any conductive traces that are formed from the same layer or sheet of conductive material as spring-biased electrical contacts. Grabbe also fails to disclose vias comprising recesses into which the spring-biased electrical contacts may be deflected. The combination with McMillan et al. also fails to teach or suggest these limitations.

In view of the foregoing, Applicant respectfully submits that independent claim 15 is allowable over the combination of Grabbe and McMillan et al. under the provisions of 35 U.S.C. § 103(a). Claims 16 through 18, 22, 24, 26, and 53 through 55, which depend from claim 15, are also allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Further, claim 26 recites that a second surface of said substrate includes "a second layer of resilient conductive material"; "a second plurality of spring-biased electrical contacts for in said second layer"; "a second plurality of conductive traces formed in said second layer"; and, at least another integrated circuit device disposed on said second surface." Claim 54 recites the limitation of a dielectric layer over the resilient conductive material "of sufficient thickness to encompass at least a portion of each lead element of said at least one integrated circuit device." Claim 55 has been amended to more clearly recite that the apertures in the dielectric layer "are of a frustoconical configuration *decreasing in size towards said layer of resilient conductive material.*" (Emphasis added.) The cited references also fail to describe these limitations, and claims 26, 54 and 55 are allowable for that reason, as well.

The rejections of claim 19 is moot, as claim 19 has been cancelled without prejudice or disclaimer.

Objections to Claims 14 and 25

Claims 14 and 25 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form. Applicant has added new independent claim 66 that incorporates the limitations of claim 14 and the limitations of prior claim 5 and amended claim 13 from which claim 14 depends. Applicant has also added new independent claim 67 that incorporates the limitations of claim 25 and the prior limitations of claims 15 and 24 from which claim 25 depends. Accordingly, Applicant respectfully submits that claims 66 and 67 are allowable. Applicant further respectfully submits that claims 14 and 25 are allowable in their present form.

Drawings

The drawings have been objected to as failing to show a second layer of resilient conductive material. As previously discussed with respect to the rejection of claim 26 under 35 U.S.C. § 112, second paragraph, Applicant respectfully submits that this feature is shown in FIG. 16 by the reference designator 530b and is further supported by the as-filed specification. Accordingly, Applicant respectfully requests the objection to the drawings be withdrawn.

Objection to the Specification

Applicant has amended the title of the invention as suggested by the Examiner.

ENTRY OF AMENDMENTS

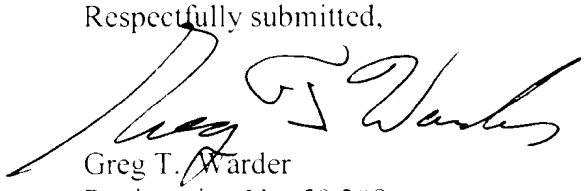
The amendments to claims 1, 3, 5, 7, 12, 13, 15, 20, 26, 46, 47, 49, 52 and 55 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

Applicant considers claims 1, 3, 5, 11, 12, 15, 16 and 26 to be generic, and note that upon allowance of a generic claim, claims depending therefrom in a non-elected species would also be allowable.

CONCLUSION

Claims 1, 3, 5, 8, 10 through 13, 15 through 18, 22, 25, 26, 44 through 55, 66, and 67 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



Greg T. Warder
Registration No. 50,208
Attorney for Applicant
TRASKBRITT
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

Date: March 12, 2003
GTW dlm:ljb
Enclosure: Version of Replacement Paragraphs of Spec with Markings to Show Changes Made
Version With Markings to Show Changes Made

Document in ProLaw

VERSION OF REPLACEMENT PARAGRAPHS OF SPEC WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

[SUBSTRATE WITH] ELECTRICAL CONTACT ARRAY [AND] FOR SUBSTRATE ASSEMBLIES

VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A substrate assembly, comprising:

a substrate;

a layer of resilient conductive material disposed proximate a surface of said substrate, said layer of resilient conductive material defining a plurality of electrically isolated conductive traces and a plurality of electrically isolated spring-biased electrical contacts, each electrically isolated spring-biased electrical contact [having] extending from one of said plurality of [an] electrically isolated conductive [trace extending therefrom] traces and further including a surface configured for biasing against and electrically contacting a lead element of an integrated circuit device; and

a plurality of vias disposed in said substrate, each via of said plurality of vias opening onto at least said surface of said substrate and comprising a recess into which one of said plurality of electrically isolated spring-biased electrical contacts may be deflected.

3. (Amended) A substrate assembly, comprising:

a substrate;

a laminate sheet of resilient conductive material bonded said substrate proximate a surface thereof, said laminate sheet of resilient conductive material defining a plurality of electrically isolated conductive traces and a plurality of electrically isolated spring-biased electrical contacts, each electrically isolated spring-biased electrical contact [having] extending from one of said plurality of [an] electrically isolated conductive [trace extending therefrom] traces and further including a surface configured for biasing against and electrically contacting a lead element of an integrated circuit device; and

a plurality of vias disposed in said substrate, each via of said plurality of vias opening onto at least said surface of said substrate and comprising a recess into which one of said plurality of electrically isolated spring-biased electrical contacts may be deflected.

5. (Amended) A substrate assembly, comprising:

a substrate having a first surface and an opposing second surface;

a layer of resilient conductive material proximate at least a portion of at least one of said first and second surfaces of said substrate;

at least one spring-biased electrical contact formed in said layer of resilient conductive material and electrically isolated from said layer of resilient conductive material by an aperture formed in said layer of resilient conductive material, said at least one spring-biased electrical contact including a surface configured for biasing against and electrically contacting a lead element extending from an integrated circuit device; and

at least one conductive trace formed in said layer of resilient conductive material and electrically isolated from said layer of resilient conductive material by at least one cavity, said at least one conductive trace terminating at said at least one spring-biased electrical contact; and

at least one via extending through said substrate and disposed at a location aligned with said at least one spring-biased electrical contact such that said at least one spring-biased electrical contact may be deflected into said at least one via.

7. (Amended) The substrate assembly of claim 5 [6], wherein said at least one via opens only onto said at least one of said first and second surfaces of said substrate.

12. (Amended) The substrate assembly of claim 5, wherein said layer of resilient conductive material comprises a layer of sputtered or CVD material [deposited on said at least one of said first and second surfaces of said substrate using a deposition process].

13. (Amended) The substrate assembly of claim 5, wherein said at least one spring-biased electrical contact further includes at least one contact element disposed on said surface of said at least one spring-biased electrical contact and configured to remove or puncture through a layer of contaminants formed on an exterior surface of a lead element extending from an integrated circuit device.

15. (Amended) An electrical component, comprising:

a substrate having a first surface and an opposing second surface;

a layer of resilient conductive material disposed proximate at least a portion of said first surface of said substrate;

a plurality of spring-biased electrical contacts formed in said layer of resilient conductive material, each spring-biased electrical contact of said plurality of spring-biased electrical contacts electrically isolated from said layer of resilient conductive material by an aperture formed in said layer of resilient conductive material;

a plurality of conductive traces formed in said layer of resilient conductive material, at least a portion of said plurality of conductive traces each terminating at one spring-biased electrical contact of said plurality of spring-biased electrical contacts, each conductive trace of said plurality of conductive traces electrically isolated from said layer of resilient conductive material and all other conductive traces of said plurality of conductive traces by at least one cavity;

a plurality of vias disposed in said substrate, each via of said plurality of vias positioned at a location underlying one spring-biased electrical contact of said plurality of spring-biased electrical contacts; and

at least one integrated circuit device disposed on said first surface of said substrate, said plurality of spring-biased electrical contacts on said first surface of said substrate arranged in at least one array corresponding to a footprint of a plurality of lead elements extending from said at least one integrated circuit device, each lead element of said plurality of lead elements of said at least one integrated circuit device [biased against and] electrically contacting one spring-biased electrical contact of said plurality of spring-biased electrical contacts and downwardly deflecting said one spring-biased electrical contact into one via of said plurality of vias.

20. (Amended) The electrical component of claim 15 [19], wherein at least one spring-biased electrical contact of said plurality of spring-biased electrical contacts is permanently deflected towards said first surface of said substrate and said via underlying said at least one spring-biased electrical contact.

26. (Amended) The electrical component of claim 15, further comprising:

a second layer of resilient conductive material disposed over at least a portion of said second surface of said substrate;

a second plurality of spring-biased electrical contacts formed in said second layer of resilient conductive material, each spring-biased electrical contact of said second plurality of spring-biased electrical contacts electrically isolated from said second layer of resilient conductive material by an aperture formed in said second layer of resilient conductive material;

a second plurality of conductive traces formed in said second layer of resilient conductive material, at least a portion of said second plurality of conductive traces each terminating at one spring-biased electrical contact of said second plurality of spring-biased electrical contacts, each conductive trace of said second plurality of conductive traces electrically isolated from said second layer of resilient conductive material and all other conductive traces of said second plurality of conductive traces by at least one cavity; and

at least [other] another integrated circuit device disposed on said second surface of said substrate, said second plurality of spring-biased electrical contacts on said second surface of said substrate arranged in at least one array corresponding to a footprint of a plurality of lead elements extending from said at least one other integrated circuit device, each lead element of said plurality of lead elements of said at least one other integrated circuit device biased against and electrically contacting one spring-biased electrical contact of said second plurality of spring-biased electrical contacts.

46. (Amended) The substrate assembly of claim 45, wherein said apertures are of a frustoconical configuration decreasing in size towards said layer of resilient conductive material.

47. (Amended) The substrate assembly of claim 3, further including a dielectric layer overlying said [layer] sheet of resilient conductive material and having apertures therethrough substantially aligned with said electrically isolated spring-biased electrical contacts.

49. (Amended) The substrate assembly of claim 48, wherein said apertures are of a frustoconical configuration decreasing in size towards said sheet of resilient conductive material.

52. (Amended) The substrate assembly of claim 51, wherein said at least one aperture is of a frustoconical configuration decreasing in size towards said layer of resilient conductive material.

55. (Amended) The substrate assembly of claim 54, wherein said apertures are of a frustoconical configuration decreasing in size towards said layer of resilient conductive material.